NO. 80-774

DEC 12

MICHAEL RODAK,

IN THE

Supreme Court of the United States

OCTOBER TERM, 1980

HUGHES AIRCRAFT COMPANY, WALTER G. FINCH, and LaVERNE McLEAN, MARK McLEAN, and CALIFORNIA FIRST BANK, as Trustees of the McLean 1976 Family Trust,

Petitioners,

vs.

MESSERSCHMITT-BOELKOW-BLOHM, GmbH,

Respondent.

On Petition for a Writ of Certiorari to the United States Court of Appeals for the Fifth Circuit

BRIEF FOR RESPONDENT IN OPPOSITION TO PETITION

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Petitioners,

vs.

MESSERSCHMITT-BOELKOW-BLOHM, GmbH,

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BRIEF FOR RESPONDENT IN OPPOSITION TO PETITION

Counter-Statement of the Case

The District Court dismissed petitioners' charge of patent infringement against respondent, a West German enterprise, for want of subject matter jurisdiction and

found that exclusive jurisdiction lies in the Court of Claims. The Fifth Circuit affirmed. Petitioners seek review by this Court because, say petitioners, there is a conflict with a prior Court of Claims decision. The jurisdictional issue is also alleged to involve "matters of great public importance" (pet., at i).

There is no conflict. Nor is the issue of public importance. Whether petitioners may seek their remedy in a district court against a private party, or are limited to an action against the United States in the Court of Claims, is of no importance to the public. A case is not proper for this Court's attention when, as here, the facts, presented by affidavit proof, are so clear-cut that the Courts below granted summary judgment.

The following factual presentation is limited to what is deemed necessary to correct inaccuracies and omissions in the petition.

1. The cooperative space project HELIOS was conceived in 1966 during discussions between the Administrator of the National Aeronautics and Space Administration of the United States (NASA) and the Minister of Science of the Federal Republic of Germany (2a*).

2. After a meeting between President Johnson and Chancellor Erhard in 1966 (1a-2a), which gave the go-ahead, NASA and its German counterpart formed a Mission Definition Group, composed of experts of both countries. These experts together commenced a massive study to outline the procedures for developing, constructing, integrating with a scientific payload, and launching two flight-rated satellites named HELIOS (3a, 6a).

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* Unless otherwise stated, all cited pages refer to respondent's appendix.

3. The Launch Vehicle Panel of the Mission Definition Group was primarily responsible for selecting an attitude control system. The Panel was dominated by NASA experts (23a). Contrary to petitioners' assertions that "the selection of an infringing design for the space vehicles was made by German personnel" (pet., at i), and that the alleged "patent infringements . . . were 100% planned and carried out by the German half of the research team" (pet., at 8), the accused attitude control system was actually selected by the Launch Vehicle Panel. The minutes of the Panel's meeting at Goddard Space Flight Center in July of 1968 read:

> "Thus, it is the *recommendation* of the Launch Vehicle Panel that the mission planning proceed on the basis of a spinning final stage configuration." (23a-24a) (emphasis added)*.

The recommendation ripened into a decision at the next meeting. In October of 1968, the Panel stated:

> "Subsequent to the July meeting it has been *decided* that the mission definition will proceed on the basis of a spinning space craft." (28a) (emphasis added).

4. The result of the study of the Mission Definition Group is embodied in the Mission Definition Group Report (MDGR). It took nine months to prepare and was signed by NASA in April of 1969 (6a-10a, 14a-16a, 32a-34a).

5. The MDGR prescribes and depicts the accused attitude control system (35a).

---

* The accused attitude control system requires a spinning satellite. The satellite does not spin if "the available alternative" (pet., at 8) is used.

6. NASA has confirmed that the selection of the accused attitude control system "was by mutual agreement and not an independent act of one of the parties". NASA's patent counsel, in an internal memorandum to NASA's Assistant Administrator, wrote:

> "This interpretation is buttressed by the fact that the MOU with BMWF* incorporates, by reference, a Mission Definition Group Report mutually agreed to by the parties, which Report specifies the technical approach for the HELIOS spacecraft. Thus, the selection of the alleged infringing system was by mutual agreement and not an independent act of one of the parties, such that the jurisdictional issue should not turn on which of the parties may have actually procurred [*sic*] the accused equipment as part of their consideration under the MOU. It is therefore concluded that substantial reasons exist to support a position that jurisdiction for the suit against MBB should be with the Court of Claims rather than a U.S. District Court." (29a-31a).

The assertion (pet., at ii) that the United States "had no responsibility in . . . the design . . . of the accused space vehicles" is thus contrary to the established facts.

7. After the Memorandum of Understanding (MOU) between the United States and the Federal Republic of Germany had been signed, President Nixon and Chancellor Kiesinger met in Washington, D.C. in 1969. The two Heads of Government confirmed that "the joint project HELIOS is of great importance." (36a).

---

* BMWF means Minister of Scientific Research of the Federal Republic of Germany.

8. The further assertions that "the sole responsibility for . . . testing of the space vehicles, and for overall mission control, rested upon the German government" and "German personnel . . . tested the space vehicles and controlled them at all times after launching", with the United States "having had no responsibility for . . . the operation of the accused space vehicles" (pet., at i-ii) are also wrong.

(a) As to testing, the unchallenged facts demonstrate that

> "some of the tests which were performed after the flight unit had been mounted on the rocket were carried out exclusively by NASA personnel and the actual launch was under the exclusive jurisdiction and responsibility of NASA and was handled by NASA." (21a).

(b) Concerning mission control and operational responsibility, the overall project manager was a NASA official (37a). A particularly striking example of NASA's supervisory and continuing active role in the HELIOS project is shown by a telex from NASA to the German Government dated December 14, 1976 (39a). The telex, although couched in polite language, is actually a command that certainly could not be disobeyed by the Germans.

The following quotations from NASA publications speak for themselves:

> "The primary responsibility for data acquisition during the HELIOS (primary) mission rests with the NASA TDS Organization, but during mission Phase II, tracking facilities within West Germany are utilized in conjunction with the DSN." (41a)

and

"3.5 *GROUND SYSTEMS*

The HELIOS Project will be supported by the Deep Space Network (DSN) and the German communications system, command station, and data center. The data interfaces between the DSN and the German ground facilities will interface at the Madrid NASCOM station. At all times during the mission, DSN control will be exercised from the Space Flight Operation Facility (SFOF), Pasadena. Mission control by the project will be exercised in the early phases from the SFOF and later from the German Control Center in Oberpfaffenhofen." (43a).

United States ground stations were still tracking and collecting data from both HELIOS space vehicles more than two years after launch (45a-47a).

9. The alleged inventions, as claimed, reside in the entire satellite structures, and not any particular subsystem, such as an attitude control system (48a-51a).

10. By letter dated March 18, 1977, (52a-53a) the United States Government gave

"its authorization and consent, without prejudice to any rights of indemnification, for all use and manufacture of any invention described in and covered by U.S. Patent Nos. 3,758,051 and Reissue 26,887* in the performance of the obligations of the Government of the Federal Republic of Germany under the Memorandum of Understanding (MOU) of June 10, 1969 and in the performance of the obligations of MBB under its contract with the Government of the Federal Republic of Germany for serv-

* These are the patents in suit.

ices to be performed in the United States relative to the Helios satellites. This authorization and consent shall apply retroactively to all Helios-connected activities that have taken place".

REASONS FOR DENYING THE WRIT

I. The Court below had ample factual basis in finding "use by the United States" in that the United States actively participated in the selection of the accused attitude control system and used and operated the patented inventions.

The thrust of petitioners' case is twofold: The United States did not participate in the selection of the accused attitude control system, and did not use or operate the patented inventions.

Both grounds are contrary to the facts. United States participation in the selection of the attitude control system was substantial. The ultimate choice was *de facto* a joint decision. The Court below correctly found (pet., at 2a):

> "During the project's nascent stages, NASA asked the German space officials to select one of two attitude control systems."

It is thus wrong to assert that the Germans, who at that time were inexperienced in space ventures, made the choice without participation by the United States.

As to the argument that the United States did not operate or use the patented inventions, it is seemingly petitioners' position that the inventions reside in the attitude control system *per se,* rather than the complete satellite structure containing the system.

The argument has no merit because the patented inventions, as *claimed,* reside in the complete satellite structures, and not in any particular subsystem. This Court, in *Continental Paper Bag Co.* v. *Eastern Paper Bag Co.,* 210 U.S. 405 (1908) enunciated the basic principle that "the claims measure the invention" (at 419). As shown, none of the asserted claims is directed to an attitude control system *per se.* All the asserted claims call for the *combination* of a vehicle or body (satellite) with particular control structure. No attitude control system alone could conceivably infringe any of the asserted claims. To infringe, the system must cooperate with and form part of a "vehicle" or "body", such as a satellite.

Even assuming *arguendo* that the alleged "inventions" of the patents in suit reside in the attitude control system, petitioners' position is based on a fallacy: to "use" or actuate the attitude control system of a satellite involves a series of complicated and sophisticated tasks. Tracking, data acquisition and calculations are thus required. Each of these tasks, in turn, requires expensive and elaborate equipment. The record shows that this equipment was located at the many NASA stations around the globe and was owned and operated by NASA. Not even petitioners contend that NASA turned over its stations to and had them operated by the German team. The ultimate actuation of the attitude control system to make a correction is accomplished by sending a command signal to the satellite. The signal is the climax of the preceding tasks. Whether a NASA employee or a member of the German team pushed the button or threw the switch to generate the command signal is irrelevant, since NASA gathered and supplied the information which enabled the sending of the signals. At the very least, NASA was instrumental in the actuation of the control system.

II. The Court below did not err in finding the *Skynet* case controlling.

The Fifth Circuit found the *Skynet* decision of the Court of Claims, *Hughes Aircraft Co.* v. *United States,* 534 F.2d 889 (1976) controlling, because, as in *Skynet,* the HELIOS project "was a shared project for the mutual benefit of both countries, with interrelated responsibilities for each" (pet., at 6a). As the Court below stated:

> "the Helios project was a joint effort, wherein the two partners participated fully in planning and carrying out nearly all aspects of the mission, for mutual benefit." (pet., at 8a).

The Court pointed to "certain factual distinctions between Skynet and this case" (pet., at 6a), but these do not support petitioners' position. Rather, the many factual similarities in the respective responsibilities of the United States in the *Skynet* and HELIOS projects highlight the correctness of the decision below.

The factual situation was described in *Skynet* as follows:

> "As earlier described, once the Skynet II satellites (both F1 and F2), including the accused orientation control system, were fabricated and delivered by the U.K. Government to the John F. Kennedy Space Center in Cape Canaveral, Florida, the U.S. Government, acting through NASA and the Air Force, assumed full and exclusive control of the project. Thus, from the time of the satellite's delivery in the United States to the time of its separation from the launch vehicle while in transfer orbit, NASA and/or the Air Force assumed sole responsibility for, *inter alia,* testing of the satellite's components and sys-

> tems and procurement, testing and mating of the launch motors and vehicles. Thereafter, NASA launched the spacecraft and, following achievement of the proper transfer orbit, the Air Force Satellite Control Facility (SCF) in Sunnyvale, California, assumed sole responsibility for the satellite's tracking and command during the 26-day period preceding F2's positioning into its final synchronous orbit". (at 902).

The above "use by the United States" activities are not only similar to the corresponding NASA activities in HELIOS, but are, in legal contemplation, essentially identical therewith.

To paraphrase the above *Skynet* narrative:

Once the HELIOS satellites (both HELIOS A and B), including the accused orientation control system, were fabricated in Germany and delivered by the German team to the John F. Kennedy Space Center in Cape Canaveral, Florida, the United States Government, acting through NASA, ultimately assumed control of the project, which during certain periods was exclusive. NASA thus participated in the testing and check-out of components and systems and, once the satellites were handed over to NASA for mating with the launching rocket, NASA's control was exclusive. The mating and the tests connected with it were performed solely by NASA. As in *Skynet* II, NASA launched the spacecraft and tracking and data acquisition were performed by NASA through its worldwide facilities for several weeks. As a matter of fact, NASA's ground stations participated for several years in the tracking and data acquisition, even after primary responsibility was turned over to German stations.

All these "use" activities were in conformity with the express provisions of the MOU. NASA's "use" of HELIOS was, in fact, more far reaching and direct than that in *Skynet*. This is so, because—pursuant to the MOU—NASA had provided and paid for part of the payload, to wit, the instrumentation for the three United States sponsored experiments, an integral part of the satellites. These three experiments were, of course, "used" by NASA and the data gathered from these and the German experiments were and still are "reduced, analyzed and distributed" pursuant to the provisions of the MOU, all to the benefit of the United States. There is thus not a scintilla of doubt that the "use by the United States" activities as they apply to HELIOS are within the ambit of the *Skynet* decision.

Petitioners point out (pet., at 9-10) that the determination in *Skynet* "was based on specific findings", one of which was "that the United States had given its explicit 'authorization and consent' to the use in the *Skynet* vehicles of the patented inventions". But the same explicit 'authorization and consent' were in fact given by the United States in respect of all HELIOS related activities as well.

III. The decision below is not in conflict with the *Carrier* holding.

Petitioners assert that the relevant facts of this case are on "all fours" with those in *Carrier Corp.* v. *United States*, 534 F.2d 244 (Ct. Cl. 1976). Since *Carrier* did not find "use by the United States", petitioners allege a conflict and urge this Court to issue a writ.

Petitioners have their facts wrong. In *Carrier*, the sole action of the United States was the placing of refuse

into containers on an Air Force base for subsequent collection and disposal by a contractor. The contractor used patented hoisting apparatus for lifting the containers onto a truck bed. The United States had no physical contact with or relationship of any kind to the patented hoisting apparatus. As a matter of fact, the government's witness testified "(t)hat he had no knowledge of the structure of the devices used" (at 248). This is poles apart from the facts here. The United States not only physically handled the patented satellites by mating them with the launching rocket, but also tested the satellites, launched them into orbit and maintained constant and prolonged radio contact with them for tracking and data gathering. As the Court below found, the United States "participated fully in planning and carrying out nearly all aspects of the mission . . ." (pet., at 8a).

Petitioners say (pet., at 7) the *Carrier* Court stressed that "the infringing machines were selected and operated solely by the third party contractor". This observation does not further petitioners' cause because, as demonstrated, the United States was an active participant both in the selection of the accused attitude control system and in the planning of the design and structure of the entire satellite. Moreover, the United States "operated" the satellites including their attitude control systems in more than one sense.

It is also emphasized by petitioners that the Court in *Carrier* gave controlling weight to the fact "that use of infringing equipment 'was not required by the contract specifications' . . ." (pet., at 7). Petitioners overlook that the MDGR, co-authored and signed by NASA, details the construction of the entire satellite, exactly as it was ultimately built.

Carrier is also inapposite, because it primarily analyzes the criteria for "use *for* the United States with its authorization or consent", a question not before this Court. The holding in *Carrier,* that there was no direct "use by the United States", is grounded on the factual finding that the contractor's alleged use of the patented invention was without direct participation by the government and had no meaningful relationship to the government's activity within the scope of the contract. This is vastly different from the present situation. Here NASA directly participated in nearly all phases of the HELIOS project. Such participation by the United States cannot be divorced from the nature of the accused attitude control system, an integral part of the spacecraft, which was selected by NASA in conjunction with the Germans, actually "used" by NASA, at least during the initial phases after launch, and without which the United States experiment structures contained in the spacecraft would have been useless.

Clearly, there is no conflict between the decision below and *Carrier.*

CONCLUSION

The Court below properly determined that the United States "used" the HELIOS satellites within the meaning of 28 U.S.C. § 1498(a). In so holding, the Fifth Circuit correctly relied on the *Skynet* case, whose facts closely parallel those here. No conflict exists with the decision in the *Carrier* case, which the Court below found to be quite remote from the HELIOS situation. Petitioners have utterly failed to sustain under Rule 17 their burden of establishing that there are special and important reasons why a writ should issue. The petition should be denied.

Respectfully submitted,

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APPENDIX

White House Press Release dated September 27, 1966

FOR IMMEDIATE RELEASE

SEPTEMBER 27, 1966

Office of the White House Press Secretary
THE WHITE HOUSE

TEXT OF JOINT COMMUNIQUE BY PRESIDENT LYNDON B. JOHNSON AND HIS EXCELLENCY DR. LUDWIG ERHARD, CHANCELLOR OF THE FEDERAL REPUBLIC OF GERMANY, FOLLOWING TALKS IN WASHINGTON, D. C.

President Johnson and Chancellor Erhard completed today the fifth of a series of meetings which began in 1963. The two leaders attach exceptional importance to these consultations, which afford an opportunity for intimate and thorough discussion of matters of mutual concern. They were accompanied by Secretary of State Rusk, Secretary of the Treasury Fowler and Secretary of Defense McNamara on the American side and Federal Ministers Dr. Schroeder, von Hassel and Dr. Westrick on the German side.

• • •

Space and Science Cooperation

The President and the Chancellor discussed possibilities for increased cooperation in technology and science and in particular in the field of space research. The Chancellor expressed his satisfaction that effective steps

White House Press Release dated September 27, 1966

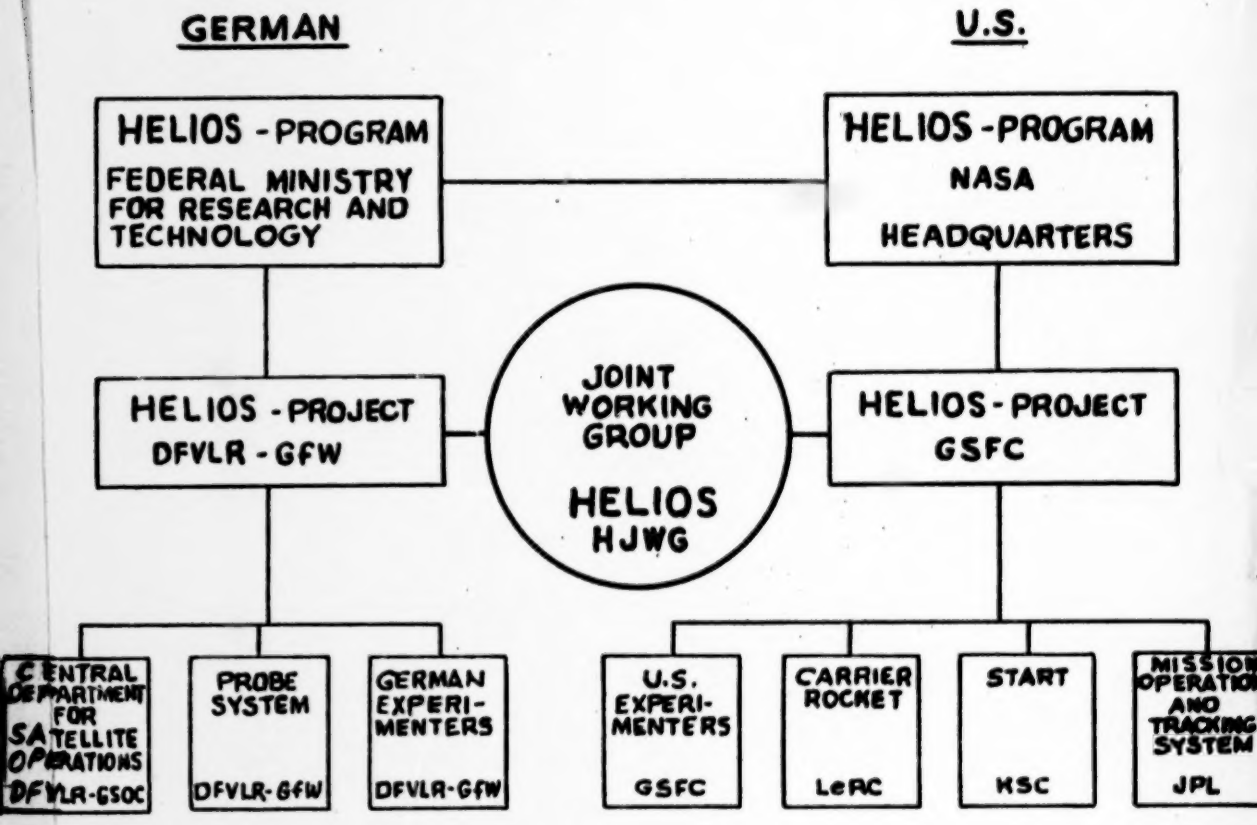
towards increased cooperation in space research have been initiated since his last meeting with the President in December 1965. The President and the Chancellor welcomed the decision to expand the present cooperative satellite program reached as a result of the recent discussions in Bonn between NASA Administrator Webb and Minister of Science Stoltenberg.

The President and the Chancellor agreed that scientific cooperation should be pressed forward for the mutual benefit of both countries and the advancement of human knowledge, preserving opportunities for additional nations to participate and contribute.

HELIOS Project Structure

(Opposite) ☛

HELIOS PROJECT STRUCTURE



NASA – NATIONAL AERONAUTIC AND SPACE ADMINISTRATION

DFVLR – DEUTSCHE FORSCHUNGS-UND VERSUCHS-ANSTALT FÜR LUFT UND RAUMFAHRT (GERMAN RESEARCH AND EXPERIMENTAL STATION FOR AIR AND SPACE TRAVEL)

G' – GESELLSCHAFT FÜR WELTRAUMFORSCHUNG (CORPORATION FOR SPACE RESEARCH)

GSFC – GODDARD SPACE FLIGHT CENTER

GSOC – GERMAN SATELLITE AND OPERATIONS CENTER

LeRC – LEWIS RESEARCH CENTER

KSC – KENNEDY SPACE CENTER

JPL – JET PROPULSION LABORATORY

HJWG – HELIOS JOINT WORKING GROUP

Affidavit of Hans Empacher

AFFIDAVIT BY HANS EMPACHER IN SUPPORT OF DEFENDANT'S MOTION TO DISMISS OR, IN THE ALTERNATIVE, FOR SUMMARY JUDGMENT

HANS EMPACHER, being first duly sworn, deposes and says that:

1. I was Commercial Director of the Space Division of Messerschmitt-Bölkow-Blohm GmbH (MBB), the defendant herein until the end of December, 1975 and am presently employed by MBB as Director of Special Activities;

2. The averments herein are made on my personal knowledge, except as to those averments that are stated on information and belief. The latter averments are supported by public records attached hereto as exhibits and I believe those averments to be true;

3. Due to my executive position in MBB and my knowledge of the events, I am competent to testify to the matters stated herein.

4. The HELIOS satellite referred to in plaintiffs' Amended Complaint is the result of a cooperative effort of the United States and the Federal Republic of Germany.

5. A chronological summary of the highlights leading to the HELIOS satellite and its successful launch into orbit around the sun is as follows:

(a) Upon information and belief, the Administrator of the National Aeronautics and Space Administration of the United States (NASA) and the Minister of Science of the

Affidavit of Hans Empacher

Federal Republic of Germany had in 1966 discussions in Bonn, Federal Republic of Germany, concerning the expansion of cooperative satellite programs that previously had been conducted by their two countries.

(b) Upon information and belief, President Lyndon B. Johnson of the United States and Dr. Ludwig Erhard, Chancellor of the Federal Republic of Germany, met in September of 1966 and agreed that scientific cooperation in the space field should be pressed forward for the mutual benefit of both countries and the advancement of human knowledge.

The averments of (a) and (b) are supported by a Release of the Office of the White House Press Secretary dated September 27, 1966. A copy of this Release accompanies this affidavit as Exhibit A. The relevant portion of Exhibit A reads as follows:

"*Space and Science Cooperation*

> The President and the Chancellor discussed possibilities for increased cooperation in technology and science and in particular in the field of space research. The Chancellor expressed his satisfaction that effective steps towards increased cooperation in space research have been initiated since his last meeting with the President in December 1965. The President and the Chancellor welcomed the decision to expand the present cooperative satellite program reached as a result of the recent discussions in Bonn between NASA Administrator Webb and Minister of Science Stoltenberg.

> The President and the Chancellor agreed that scientific cooperation should be pressed forward for the mutual benefit of both countries and the advancement of human knowledge, preserving opportunities for additional nations to participate and contribute."

(c) Upon information and belief, as the result of the agreement reached between President Johnson and Chancellor Erhard and after further discussions between officials of NASA and the government of the Federal Republic of Germany, a massive study was jointly conducted by experts of both countries including NASA officials, with a view to outlining the procedures for developing, constructing, integrating with a scientific payload and launching two flight-rated satellites—sometimes referred to as "solar probes"—named HELIOS. The purpose of the contemplated mission was exclusively scientific. HELIOS thus was to provide new understanding of fundamental solar processes and solar-terrestrial relationships by the study of phenomena, such as solar wind, magnetic and electric fields, cosmic rays and cosmic dust. To this end, HELIOS was to be launched into a solar orbit approaching the sun to within a distance of approximately one third of that between the sun and the earth. The spacecraft was to carry—and does actually carry—a payload consisting of ten data gathering experiment structures. Three of the experiment structures were to be designed by U.S. scientists and built in the U.S. while the remaining seven experiment structures were to be of German origin.

The study resulted in a report entitled MISSION DEFINITION GROUP REPORT (MDGR) which took nine months to prepare and which was signed and released in behalf of NASA and the German Minister for Scientific

Research in April of 1969. A copy of the MDGR—a voluminous document of 277 pages plus Foreword and Appendix —accompanies this affidavit as Exhibit B. The MDGR formed the basis for the actual realization of Project HELIOS, which in turn resulted in the HELIOS satellites.

NASA's deep involvement in and crucial contribution to Project HELIOS are spelled out at great length in the MDGR.

(i) Section 5 (pages 234-268) of the MDGR is entitled MANAGEMENT INFORMATION AND CONTROL and sets forth *inter alia* NASA's management responsibility for Project HELIOS (pages 234-246). Figure 5-1 on page 236 entitled HELIOS-NASA PROJECT ORGANIZATION CHART graphically illustrates the extensive organization within the NASA establishment which was suggested—and later actually implemented—with the view to discharging NASA's responsibilities under the HELIOS Project.

(ii) In respect of funding, manpower and facilities, the MDGR states on page 269 as follows:

> "FUNDING (NASA)
>
> The NASA funding required for the HELIOS program is presented in Table 6-I. The total amount of $30,269.00 (sic) includes all of the funding required to complete the NASA portion of the HELIOS program with the exception of launch vehicle annual operating cost not properly allocable to specific missions as indicated in the referenced figure. It is the NASA practice for Code SV at NASA Headquarters to collectively fund the Centaur launch operations costs, rather than by individual mission.
>
> MANPOWER (NASA)

Affidavit of Hans Empacher

> The NASA manpower required for the HELIOS program is presented in Table 6-II. The total amount of 361.3 man years of effort includes all of the manpower required to complete the NASA portion of the HELIOS program.
>
> FACILITIES
>
> Each country is responsible for the checkout and testing of all the hardware supplied by it. Therefore, each country is responsible for providing the specific facilities required to accomplish its tasks."

The above quoted excerpt contains a typing error in that the "$30,269.00" figure as appearing in the original report should read—$30,269,000—as supported by Table 6-I on page 230 and the Summary on page 9 where the correct figure appears.

(d) The MDGR includes as Appendix a SUGGESTED MEMORANDUM OF UNDERSTANDING BETWEEN THE FEDERAL MINISTER FOR SCIENTIFIC RESEARCH OF THE FEDERAL REPUBLIC OF GERMANY AND THE UNITED STATES NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. The suggestions contained therein were formally adopted by the two governments on June 10, 1969 by the execution in the English and German languages of an actual MEMORANDUM OF UNDERSTANDING BETWEEN THE FEDERAL MINISTER FOR SCIENTIFIC RESEARCH OF THE FEDERAL REPUBLIC OF GERMANY AND THE UNITED STATES NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (MOU). A copy of the English language version of the MOU accompanies this Affidavit as Exhibit C. The MOU specifically refers to the MDGR and thus states on page 1:

Affidavit of Hans Empacher

"The basic plan for implementing this project is contained in the HELIOS Program Mission Definition Group Report (NASA-BMwF*), dated April 1969."

NASA's responsibilities are summarized on page 3 of the MOU as follows:

"NASA will use its best efforts to:

A. Provide instrumentation for U.S.-sponsored experiments that are agreed elements of the payload.

B. Supply those parts of the spacecraft and ground checkout equipment peculiar to the U.S.-sponsored experiments

C. Provide a launch vehicle of the Atlas/Centaur/TE 364-4 class, payload adapter section (including separation system), spin table, and shroud for each mission.

D. Launch the spacecraft.

E. During Phases I and II provide tracking and data acquisition support using available U.S. near earth, deep space, and space flight operations facilities.

F. During Phase III provide for the use of elements of the Deep Space Network (DSN) which are mutually agreed to be necessary.

G. Reduce, analyze and distribute data in accordance with a mutually agreed plan.

---

* BMwF stands for "Minister for Scientific Research of the Federal Republic of Germany".

H. Make available such training of German personnel in BMwF areas of responsibility for direct utilization in this joint project as may be requested by BMwF and as is feasible within the limitations of NASA operational requirements.

I. Provide relevant technical consultation and technical data as mutually agreed.

J. Provide technical assistance in testing the spacecraft and review final acceptance tests of the spacecraft.

Final determination of the suitability of flight units for launchings will be a joint BMwF/NASA decision.

No exchange of funds is contemplated between the BMwF and NASA who will individually bear the costs of discharging their respective responsibilities, including travel and subsistance of their own personnel and transportation charges on all equipment for which they are responsible."

Upon information and belief, Project HELIOS actually proceeded pursuant to the terms of the MOU and as spelled out in greater detail in the MDGR.

(e) Upon information and belief, President Nixon of the United States and Chancellor Kiesinger of the Federal Republic of Germany met in August of 1969 in Washington, D.C., at which time they reaffirmed the importance of Project HELIOS to the United States and the Federal Republic of Germany. Exhibit D is a copy of a Release by the Office of the White House Press Secretary dated August 8, 1969. The relevant passage on page 2 reads as follows:

Affidavit of Hans Empacher

> "On the subject of bilateral technological cooperation, the President and the Chancellor welcomed the progress made, especially in the field of space research, where *the joint Project Helios is of great importance. They agreed to continue and to widen this cooperation.*" (Emphasis supplied)

(f) Pursuant to the MOU, the government of the Federal Republic of Germany, represented by the German Space Agency "Gesellschaft für Weltraumforschung m.b.H." (GfW), issued in October of 1969 a call for tenders for the development and manufacture of the HELIOS satellites with which the ten experiment structures referred to were to be integrated.

(g) In response to the call for tenders, MBB, with the cooperation of other European firms, prepared and submitted a proposal to GfW late in 1969.

(h) As a result of competitive bidding, MBB was appointed as the prime industrial contractor for the HELIOS Project and entered into a contract to this effect with GfW in 1970.

Supervision, management and overall responsibility remained in NASA and the government of the Federal Republic of Germany as represented by GfW. The actual HELIOS Project management structure shared by the two governments is represented by the Chart of Exhibit E.

(i) MBB thereupon produced and integrated a HELIOS prototype and flight unit in its plant facilities in Germany and integrated the payload consisting of the three United States and seven German experiment structures with the

satellites. NASA officials participated throughout the Project, furnished extensive assistance and visited for these purposes MBB's plant facilities in Germany.

(j) After completion and testing of the two satellites in Germany, they were flown to the United States for further testing by MBB and NASA personnel at the John F. Kennedy Space Center in Cape Canaveral, Florida. During the entire project, MBB was under the control and auspices of GfW. The prototype was ultimately returned to Germany while the flight unit was handed over to NASA for mating with and mounting on a NASA launching rocket. The flight unit was successfully launched by NASA from Cape Canaveral on the U.S.-funded rocket on December 10, 1974 and is still orbiting the sun. Tracking and data acquisition were initially performed by NASA pursuant to the terms of the MOU. As of January 11, 1975, tracking and data acquisition were handled by German stations with the assistance of NASA stations.

A second flight unit was thereafter completed by MBB in Germany and flown to the United States. Its initially scheduled launch in December of 1975 by NASA was postponed due to a fire in NASA's launch facilities at the Eastern Test Range in Cape Canaveral. Actual launch was successfully effected by NASA on January 15, 1976.

6. Attached hereto as Exhibit F is a copy of NASA's INTERNATIONAL SATELLITE PROJECTS AND THE SIGNIFICANCE OF HELIOS, May 1975, by Gilbert W. Ousley of NASA's Goddard Space Flight Center who is the U.S. Project Manager for HELIOS.

7. Accompanying this affidavit as Exhibit G is a PRESS-INFORMATION TO THE LAUNCH OF THE SOLAR

PROBE HELIOS published by MBB. This press information describes the origin and significance of the Project, the scientific mission, the technical problems and the Project organization.

8. I do not know the actual amount of money which was spent by the United States for Project HELIOS and to what extent the actual amount corresponds to the amount stated in the MDGR as quoted in paragraph 5 (c) (ii) herein. However, upon information and belief and based on NASA press releases 74-314, page 9, and 75-317, page 5, attached hereto as Exhibits H and I, the U.S. financial investment is about 80 million dollars

HANS EMPACHER

Affidavit of Albert Ziegler

AFFIDAVIT BY ALBERT ZIEGLER IN SUPPORT OF DEFENDANT'S MOTION TO DISMISS OR, IN THE ALTERNATIVE, FOR SUMMARY JUDGMENT

ALBERT ZIEGLER, being first duly sworn, deposes and says that:

1. I am the Integration and Test Manager for Project HELIOS of Messerschmitt-Boelkow-Blohm GmbH (MBB), the defendant herein, and have held this position since March 1, 1972. My duties as Integration and Test Manager include the planning of performance and evaluation of integration and test activities for the HELIOS prototype and flight units.

2. I am well familiar with those aspects of the HELIOS Project which fall under my jurisdiction. The averments are, therefore, made herein on my personal knowledge with respect to events that occurred subsequent to March 1, 1972, and on information and belief with respect to events prior thereto.

3. I am familiar with the HELIOS Mission Definition Group Report of April 1969 (MDGR) and the Memorandum of Understanding between the Federal Minister for Scientific Research of the Federal Republic of Germany and the United States National Aeronautics and Space Administration of June 10, 1969 (MOU) which accompany the Empacher affidavit as Exhibits B and C.

4. The MDGR broadly outlines the then contemplated procedures for joint review and working group meetings between NASA and German officials and personnel in-

volved in the HELIOS Project to cooperate on the various phases of the Project and to discuss and resolve mutual problems. The establishment of a HELIOS Joint Working Group is also recommended in the MDGR. Pages 243 and 244 of the MDGR thus state:

"5.2.7 *Project Coordination*

5.2.7.1 *Project Coordination Meetings*

Project coordination meetings are called by the Project Managers as required to resolve interface problems in the various subsystem areas. The Project Manager will specify individuals on the project staff whose attendance is required, depending upon the purpose of the particular meeting.

The Program Manager will be informed of the technical, operational, and financial status of the project by informal verbal communication with the GSFC* Project Manager, and by written communication through normal administrative channels. All GSFC commitments will be handled through the GSFC Director's Office.

5.2.7.2 *Working Group Meetings*

Working group meetings will be called to coordinate the various phases of the project throughout design, development, testing, and prelaunch.

"5.2.7.3 *HELIOS Joint Working Group*

The Joint Working Group, basic committee for the HELIOS project, consists of persons actively en-

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* GSFC stands for Goddard Space Flight Center, Greenbelt, Md.

gaged in the development of the project, or having scientific or engineering cognizance of particular phases of the project. The members are capable of individually resolving problems within their areas, and collectively or in *ad hoc* committees are competent to resolve problems having overlapping facets. The group confines itself to scientific, engineering, and technical problems. Recommendations may be made to the chairman on altering policy which might have an adverse effect on the project. The periodic meetings are a means of interchanging problems, resolutions, and experiences which provide a valuable stimulus, particularly when the project requires a concerted effort.

It is presently envisioned that the HELIOS Working Group will have five sub-groups. Namely, Experiments (Chairman-German), Spacecraft (Chairman-German), Tracking and Data Acquisition (Chairman-American), Launch Vehicle (Chairman-American) and Operations (Chairman-Either)."

5. The MOU adopts the recommendations of the MDGR and states on top of page 4 as follows:

"BMwF* and NASA agree to designate a single Project Manager each to be responsible for coordinating the agreed functions and responsibilities with the other in the implementation of this agreement. Together they will establish a Joint Working Group with appropriate membership. Details for implementation shall be resolved on a mutual basis within this working group."

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* BMwF stands for "Minister of Scientific Research of the Federal Republic of Germany

6. Pursuant to the terms of the MOU and the MDGR, close cooperation was maintained throughout the HELIOS Project between NASA officials on the one hand and officials of the German govenment and MBB as the prime industrial contractor on the other. The continuous contact and cooperation between the United States and German sides of the Project took place according to specific policies and procedures which were set down in a number of "Handbooks" and which were strictly followed.

The HELIOS Project was subjected to seven formal Reviews during its life cycle, to wit,

(1) System Design Review (SDR)

(2) Preliminary Design Review (PDR)

(3) Critical Design Review (CDR)

(4) First Article Configuration Inspection (FACI)

(5) Qualification Review (QR)

(6) Flight Readiness Review (FRR), and

(7) Mission Readiness Review (MRR).

Of these seven Reviews two, to wit, the Preliminary Design Review and the First Article Configuration Inspection, were internal Reviews by the German side, while the five other Reviews were joint Reviews between NASA and the German side. The five Reviews in which the U.S. side participated were co-chaired by NASA and the Gesellschaft für Weltraumforschung (GfW) (Corporation for Space Research), the latter representing BMFT (Minister for Research and Technology) of the Federal Republic of Germany.

Affidavit of Albert Ziegler

Upon information and belief,

the five Reviews which were co-chaired by NASA with the German side took place during the following periods:

System Design Review (SDR) (also referred to as Conceptional Design Review)	February 1971
Critical Design Review (CDR)	October 1972
Qualification Review (QR)	February 1974
Flight Readiness Review (FRR)	September 1974
and Mission Readiness Review (MRR)	December 1974.

A description of the seven Reviews appears on pages 2, 3 and 4 of the Flight Readiness Review Handbook accompanying this affidavit as Exhibit I.

The following statement appears on page 2 of the Handbook:

> "Project HELIOS will have undergone seven formal reviews during its life cycle. These are the System Design Review (SDR), the Preliminary Design Review (PDR), the Critical Design Review (CDR), the First Article Configuration Inspection (FACI), the Qualification Review (QR), the Flight Readiness Review (FRR) and the Mission Readiness Review (MRR). Of these, the Preliminary Design Review and the First Article Configuration Inspection are internal GfW reviews. All of the others are joint NASA-BMFT reviews planned and carried out for NASA and BMFT by the GSFC and GfW HELIOS Project Offices. These joint reviews are co-chaired by NASA and BMFT representatives.

> The Review Teams are composed of selected technical specialists and are formally appointed by joint NASA and BMFT actions. The basic purpose of all of these reviews is to insure that the HELIOS spacecraft, subsystems and ground and operation systems are highly reliable and that they will fulfill mission requirements. The review results and recommendations are formally documented in a written report covering major findings and action items. These findings and action items are advisory in nature and changes or corrective actions are implemented by joint agreement between the GSFC and GfW HELIOS Project Managers."

7. Accompanying this affidavit as Exhibit II is the Qualification Review Handbook dated December 1973 which formed the basis for the Qualification Review referred to above. Exhibit III is the Project Management Handbook dated June, 1972, outlining the procedure for the Critical Design Review of Project HELIOS.

8. Pursuant to the provisions of the Handbooks as quoted hereinabove, the actions and decisions resulting from the Reviews were documented in written Reports. Accompanying this affidavit as Exhibit IV is thus as an example the "Summary of Actions and Decisions Resulting from HELIOS Spacecraft Critical Design Review October 1972", dated September 1973 while Exhibit IV-A is a similar Summary dated March 1973. Exhibit V is the "Qualification Review Report on HELIOS Satellite" dated March 1974. It will be noted that the latter Report was published by NASA and states on the second page that

> "the review was conducted by a team of specialists from the NASA and GSFC (Goddard Space Flight

Center) and ESRO/ESTEC (European Space Research Organization) under the co-chairmanship of the German BMFT (Minister for Research and Technology) and NASA. The report is submitted for the joint use of the GfW (Corporation for Space Research) and NASA Project Managers."

9. I personally attended several of the Reviews during which NASA officials actively participated in the discussions, voiced objections and made recommendations which were oftentimes adopted. I thus recall, for example, the following incident: The ion guard constructed by MBB for HELIOS-A had proved unsatisfactory and had caused a failure of the Radio Wave Experiment. MBB then proposed to redesign the ion guard for HELIOS-B and for this purpose suggested the use of a specific thickness of metal material for the ion guard tubing. The thickness of the metal material is of great importance in order to withstand the launch environment NASA disagreed with the MBB proposal and suggested a different thickness of metal material. NASA's recommendation was adopted and the ion guard was constructed pursuant to the NASA specification.

Throughout the life of the Project, extensive correspondence and a constant flow of information took place between the German and United States sides in addition to the formal Review meetings referred to above and NASA furnished assistance to its German partner throughout the development, construction, integration and testing of the HELIOS satellites in Germany.

10. Three of the ten experiment structures which are carried by each HELIOS satellite were designed and con-

structed in the United States and were supplied to MBB for integration with the satellite structure. The overall supervisor for the U.S. experiments was a NASA official and the integration and testing of the U.S. experiments were carried out in Germany with the active participation and under the management of U.S. personnel.

11. After the HELIOS satellites, including the experiment structures integrated therewith, had been completed in Germany, they were flown to the United States on commercial aircraft. The unloading of the satellites from the aircraft in the United States was effected with NASA equipment and with the support of NASA personnel. The subsequent testing of the satellites was also effected with NASA participation on NASA facilities. NASA provided for this purpose cabling, power, intercom systems and link connections between the NASA facilities and the HELIOS checkout equipment. All storage and transport of the HELIOS satellites and support equipment between the various NASA facilities were handled by NASA personnel with NASA equipment.

12. The HELIOS flight unit was mounted by NASA personnel on a NASA launching rocket and the actual mating operations between rocket and satellite and the subsequent compatibility tests were performed by NASA personnel with NASA equipment. Some of the tests which were performed after the flight unit had been mounted on the rocket were carried out exclusively by NASA personnel and the actual launch was under the exclusive jurisdiction and responsibility of NASA and was handled by NASA. The tracking of the satellite after its successful launch as well as data acquisition were initially carried out by NASA through its world-wide facilities.

13. Accompanying this affidavit as Exhibit VI is a paper presented at the Ninth International Symposium on Space Technology and Science, Tokyo, Japan, and entitled "HELIOS Cooperative Solar Probe", co-authored by the U.S. Project Manager of HELIOS, Gilbert Ousley of NASA's Goddard Space Flight Center and Ants Kutzer, the HELIOS Project Manager for the German side. This paper gives a succinct overview of Project HELIOS.

14. Accompanying this affidavit as Exhibit VII is the PROJECT PLAN FOR HELIOS-A AND -B published by NASA's Goddard Space Flight Center, Greenbelt, Maryland. Exhibit VII contains an in-depth description of the entire project plan.

ALBERT ZIEGLER

Report of First Meeting of the Launch Vehicle Panel

REPORT OF FIRST MEETING OF THE LAUNCH VEHICLE PANEL OF THE GERMAN SOLAR PROBE MISSION DEFINITION WORKING GROUP

Date: July 31, 1968

Place: Goddard Space Flight Center, Greenbelt, Maryland

Attendance:	T. B. Morris	NASA HQTS.
	Dieter Ottemeyer	BFWF
	Gilbert Ousley	NASA GSFC
	John Kramer	NASA LeRC
	Dietrich Koelle	Boelkow AG

The panel outlined those areas which require either early resolution or agreed-to assumptions in order to proceed with a meaningful effort to define the launch vehicle-related aspects of the mission. The areas considered along with the conclusions and assumptions made are discussed in the following paragraphs.

Spinning Vs. Non-Spinning S/C: The question of a spinning vs. a non-spinning spacecraft during the final propulsion stage burn is the most basic question to be answered from a launch vehicle viewpoint. A non-spinning ascent mode would require the adaptation of a Burner II to the Centaur stage while the spinning mode would permit adaptation of the spin stabilized TE-364 to the Centaur stage. The use of a TE-364 should result in a lower recurring cost, and a less complex higher performance launch vehicle system. *Thus it is the recom-*

mendation of the launch vehicle panel that the mission planning proceed on the basis of a spinning final stage configuration. The spin rate should be assumed to be between 60-100 rpm. If it is decided that three axis stabilization is required for the operational phase of the spacecraft, the launch vehicle panel would prefer that this be accomplished by the spacecraft after despinning it following injection into orbit.

Performance: Performance analyses are sensitive to the vehicle configuration, the mission profile and other unique mission constraints which tend to become requirements as the mission definition progresses. Ideal performance based on the use of a spin stabilized TE-364-4 (2300 lbs. of propellant) with the adaptation of a Delta type spin table is a maximum of 568 lbs. *based on all of the assumptions specified in the performance data presented by Mr. Kramer* and included in the Launch Vehicle Presentation by T. Bland Morris and John Kramer on 8 August 1968.

However, in view of the facts that actual test data do not exist on the TE-364-4, that actual weight statements do not yet exist on a TE-364-4 Centaur installation and that other mission constraints which historically cost performance have not yet been defined, *the spacecraft design goal should be constrained to a maximum weight of 475 pounds at 0.3 AU for a spinning configuration.*

It was decided not to consider a three axis stabilized Burner II configuration as the performance for this version on a comparable basis would be approximately 300 lbs. or less.

Report of First Meeting of the Launch Vehicle Panel

Vehicle Spacecraft Interface: It was agreed that an attempt would be made to use the existing Delta spin table and payload adapter. *The payload adapter to be assumed is 37 inches in diameter. It was agreed that the United States should provide the spacecraft separation hardware and signal.* For purposes of performance, the weight of all items above the separation plane are chargeable to the spacecraft total weight.

NASA will perform a preliminary analysis of the Delta hardware to confirm that no serious problems exist in its adaptation to the Centaur. NASA will provide the co-chairmen with a new layout of the Centaur forward end and spacecraft envelope using a Surveyor fairing.

The launch vehicle panel noted that it is highly desirable that the spacecraft fit the existing fairing. However, if this proves not be a reasonable constraint, the cylindrical section can be extended. It should be understood that the added weight of an extension will reduce performance. A rough order of magnitude basis for estimating the performance loss was provided as follows:

Fairing-Weight Increase = 5.4 lb/inch of extension
Performance Decrease = 0.025 lb P/L / lb fairing

Action Items: It was agreed that the NASA would undertake the following action items:

I — Provide a payload envelope layout of the Centaur, spinning TE-364 in a Surveyor fairing.

II — Provide a definition of the TE-364-4 characteristics and adjust performance if required.

III — Provide a proposed interface definition. (i.e. spacecraft adapter mating geometry.)

Report of First Meeting of the Launch Vehicle Panel

IV — Determine the allowable center of gravity location of the spacecraft above the separation plane.

V — Provide emissivity data for the internal surface of the fairing and other miscellaneous data of a similar nature.

Report of Second Meeting of the Launch Vehicle Panel

REPORT OF SECOND MEETING OF THE
LAUNCH VEHICLE PANEL

OF THE "HELIOS" MISSION DEFINITION WORKING GROUP

Date: October 15, 16, 17, 1968

Place: Bundesminister für wissenschaftliche Forschung, Bonn

Attendance:

Name:	Organization:	Attended:
T. B. Norris	NASA Headquarters	Oct. 15, 16, 17
Dieter Ottemeyer	BMwF	" 15, 16, 17
Gilbert Ousley	NASA GsFC	" 15, 16, 17
John Kremer	NASA LeRC	" 15, 16, 17
Dietrich Knoebig	ERNO	" 15
H. Schweig	Bölkow	" 16
W. Müller	Bölkow	" 16
K. Bohnhoff	Bölkow	" 16

The panel reviewed the status at action items assigned at the 31 July meeting. All of these items have now been completed.

It was agreed that special attention should be given to those areas which will constrain the basic spacecraft configuration and the vehicle performance capability.

Report of the Second Meeting of the Launch Vehicle Panel

SPIN RATE CONSIDERATIONS

Subsequent to the July meeting it has been decided that the mission definition will proceed on the basis of a spinning spacecraft. A spin rate of 60 (+—) 10 RPM has been chosen as a basis for the spacecraft (s/c) operating phase. The ability of the launch vehicle to provide a spin rate to this accuracy cannot be demonstrated. *Thus it is the recommendation of the launch vehicle panel that the spacecraft provide an active spin rate control capability if a specific spin rate is required.*

BMwF will translate the final s/c spin rate to a spin rate at s/c separation from the launch vehicle third stage (TE-364-4) and provide this number to the NASA along with a definition of s/c mass properties for use in a preliminary s/c third stage stability analysis.

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Part of Memorandum from NASA's Patent Counsel to NASA's Assistant Administrator

May 7, 1975

To: I/Arnold W. Frutkin

FROM: GP/Robert F. Kempf

SUBJECT: Patent Position for Cooperative Agreements (Foreign); Authorization and Consent, and Patent Indemnity

Recent situations have arisen wherein contractors (both foreign and domestic) performing work for a foreign government under a Cooperative Agreement with a U.S. Government Agency have been sued for patent infringement (of a U.S. Patent) in a U.S. District Court. This, in turn, has raised broader issues as to the proper forum for such suits (i.e. whether the suit should be in a District Court or in the Court of Claims), as well as the position the involved U.S. Agency should take with respect to both the jurisdictional question and the liability for any resulting damages (i.e. whether or not the Agency should seek indemnity from the involved foreign government). Resolution of such issues may require that the language used in Cooperative Agreements be modified to expressly cover the situation in the future.

Specifically, Hughes Aircraft Company brought suit in the U.S. District Court, Southern District of Florida, against Philco-Ford Corp. and The Marconi Company, Ltd. for alleged infringement of two U.S. Patents (*Williams*, 3,758,-051; and *McLean*, Re 26,887), as a consequence of the launch of the SKYNET IIA and IIB spacecraft. These spacecraft were built in Great Britain by Marconi (with subcontract support by Philco-Ford), shipped to the United

Part of Memorandum from NASA's Patent Counsel to NASA's Assistant Administrator

States, and made launch ready pursuant to a Memorandum of Understanding (MOU) between the United States Air Force Space and Missile Systems Organization (SAMSO) and the Ministry of Defense (MOD) of Great Britain. NASA's involvement stems from the launch of SKYNET on a Delta launch vehicle for SAMSO on a totally reimbursable basis. Subsequently, Hughes took similar action against Messerschmidt-Bolkow-Blohm (MBB) based on the launch of HELIOS, which launch was pursuant to a MOU between the Federal Minister for Scientific Research (BMwF) of the Federal Republic of Germany and NASA. Currently there is an attempt by Marconi and Philco-Ford (and supported by the Air Force) to move the SKYNET suit into the Court of Claims and join it with another pending suit based on the *Williams* patent, brought by Hughes directly against the United States. No such move has yet been made by MBB in the suit involving HELIOS.

* * *

Without going into a detailed analysis of the respective MOU's involved in the two suits involving SKYNET and HELIOS, it is fair to conclude that the one involving HELIOS presents a stronger case for Court of Claims jurisdiction, in terms of degree of participation of the parties, funding arrangements, and the sharing of benefits and results. Also, of particular interest is a statement in the MOU between BMwF and NASA that:

> "The BMwF and NASA shall, in relation to each other, bear full responsibility for any damages to their respective nationals in the course of this cooperative project."

Part of Memorandum from NASA's Patent Counsel to NASA's Assistant Administrator

While, as understood, physical damage was contemplated when the statement was written, it is broad enough in its terms to encompass non-physical damage (such as patent infringement) as well. Further, it represents an intent of the parties that each is to be responsible for damage to its nationals for the overall activities of the project, independently of which party may perform the acts causing the damage, which intent can easily be extrapolated to include all legal events, and not only those causing physical damage. This interpretation is buttressed by the fact that the MOU with BMwF incorporates, by reference, a Mission Definition Group Report mutually agreed to by the parties, which Report specifies the technical approach for the HELIOS spacecraft. Thus the selection of the alleged infringing system was by mutual agreement and not an independent act of one of the parties, such that the jurisdictional issue should not turn on which of the parties may have actually procured the accused equipment as part of their consideration under the MOU.

It is therefore concluded that substantial reasons exist to support a position that jurisdiction for the suit against MBB should be with the Court of Claims rather than a U.S. District Court.

* * *

Original signed by

ROBERT F. KEMPF
Office of Assistant General
Counsel for Patent Matters
GP/RFKempf:mkm:5/7/75

Preamble of Mission Definition Group Report (MDGR)

HELIOS PROGRAM

MISSION DEFINITION GROUP
REPORT

APRIL 1969

NASA — BMwF

The preparation of this Mission Definition Group Report represents a new approach in NASA international programs, i.e. the definition in depth of the entire cooperative mission (including as much spacecraft and operational detail as practical) before the Memorandum of Understanding is signed. It has become readily apparent to the Co-Chairmen during the preparation of this report that the magnitude, complexity and combined expense of the HELIOS project fully justifies this exhaustive and time consuming (9 months) approach. There is no question in the minds of the key members of the Mission Definition Group that the efforts culminating in this report will result in a more viable, more substantive program with a high probability of meeting the enclosed realistic schedule and funding estimates.

The Co-Chairmen gratefully acknowledge the competent and untiring contributions by the personnel of the GfW, GSFC, JPL, LeRC, DFVLR, BMwf, NASA Headquarters and by the experimenters from various institutes and universities.

Approved by:

s/ Karl Kaesmeier
Karl Kaesmeier
(BMwf)

s/ Rudolf Stampfl
Rudolf A. Stampfl
(NASA)

Preamble of Mission Definition Group Report (MDGR)

FOREWARD

This report documents the studies and establishes the feasibility to carry out a solar probe mission as part of a cooperative program of space research between the United States National Aeronautics and Space Administration and the Bundesminister für wissenschaftliche Forschung of the Bundesrepublik Deutschland.

A further objective of this report is to define

a mission concept

a feasible approach

a method of implementation.

The report is structured around the Technical Plan which includes discussions of the scientific missions since they are the basic purpose of the project. The Technical Plan also discusses details of the technological development required to support the scientific mission objectives and maintain and operate the scientific instruments in space. Thus, the scientific payload, the spacecraft containing the power, data handling, stabilization, telecommunications, and structural and thermal systems, the ground data acquisition system, data processing, and the launch vehicle system are also described in detail. Throughout this report an attempt is made to present principal design choices and to demonstrate feasible approaches, since at this stage of the project it is not possible to have a specific design to recommend in all areas.

Emphasis is shown on:

potential development problems or risks

criteria and information required e.g. study results to make the choices from different options.

Preamble of Mission Definition Group Report (MDGR)

Only with a clear understanding of the technological requirements is it possible to estimate the resources in time, manpower, facilities, and money required for the execution of the project. Special consideration as to the proper management approach is required in this advanced project, where the resources are distributed over so many organizations. Thus, the report describes a plan for managing the Project and for contracting with industry, universities, research organizations and government controlled establishments.

A PDP will be prepared following in general the directives given in NASA's General Management Instruction 4-1-1 "Planning and Implementation of NASA Projects" subsequent to formal agreement between the Bundesrepublik Deutschland (BRD) and the United States. It shall be the responsibility of the Project Managers to modify and reissue the Plan.

Page 72 of the Mission Definition Group Report (MDGR)

(Opposite) ☛

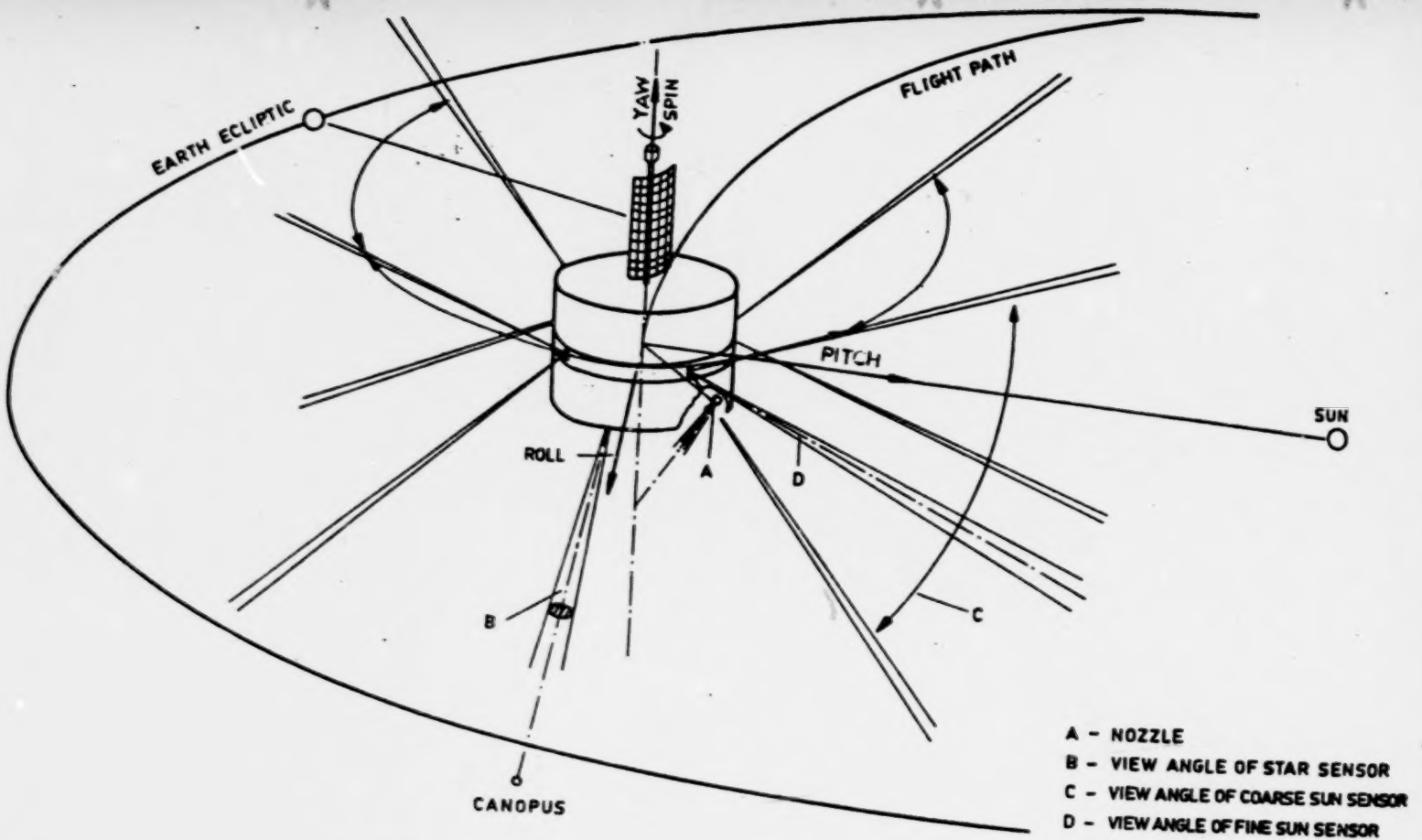

FIG. 3.5.4-1 ATTITUDE MEASUREMENT AND CONTROL

White House Press Release dated August 8, 1969

FOR IMMEDIATE RELEASE AUGUST 8, 1969

Office of the White House Press Secretary

THE WHITE HOUSE

JOINT STATEMENT FOLLOWING MEETINGS BETWEEN PRESIDENT NIXON AND CHANCELLOR KIESINGER, IN WASHINGTON, D.C.

President Nixon and Chancellor Kiesinger issued the following joint statement at the conclusion of their meeting at the White House on August 8:

The President and Chancellor Kiesinger are very pleased to have had the opportunity to meet together during the past two days and to continue their personal consultations on important issues which they had begun during President Nixon's visit to Germany in February. They agreed that the meetings just concluded were extremely useful. They were characterized by an atmosphere of warm friendship and mutual confidence which is an important element in relations between the United States of America and the Federal Republica (sic) of Germany.

• • •

On the subject of bilateral technological cooperation, the President and the Chancellor welcomed the progress made, especially in the field of space research, where the joint Project Helios is of great importance. They agreed to continue and to widen this cooperation.

• • •

NASA's International Satellite Projects and the Significance of HELIOS

by

GILBERT W. OUSLEY

Presented at the DGLR Symposium on the significance and results of the HELIOS Space Program
Munich, Germany

May 1975

NASA'S INTERNATIONAL SATELLITE PROJECTS AND THE SIGNIFICANCE OF HELIOS

by

Gilbert W. Ousley*

This technical paper presents an overview of the basic NASA ground rules, guidelines, and practices associated with the establishment and conduct of a NASA International Cooperative Project and emphasizes the overwhelming importance of Helios. The projects presented and discussed are limited to those where the management responsibility has been assigned to the Goddard Space Flight Center (GSFC) by NASA Headquarters. These include the project management responsibility for twenty-one (21) of the twenty-two (22) cooperative satellites previously launched, and one (1) of the two (2) cooperative satellites presently under development (Helios B and the Canadian CTS spacecraft).

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* Chief, International Projects Office and U.S. HELIOS Project Manager, Goddard Space Flight Center, Greenbelt, Maryland.

NASA's International Satellite Projects and the Significance of HELIOS

The basic authority for NASA's conduct of international space activities rests in the Public Law 85-568 which established the Agency in July 1958 (see Figure 1). Some of the basic values of international cooperation and NASA's objectives are provided in Figure 2 and 3 respectively. In my opinion, one of the fundamental reasons for NASA's well recognized success in conducting international satellite projects is embodied in Guidelines (2), (3), and (4) on Figure 4. The agreement on specific, well defined projects of scientific validity and mutual interest, and each Government's acceptance of its own financial responsibility, establishes a solid, well understood foundation from which an international project can be successfully managed. The successful resolution of complex satellite/experiment/launch vehicle/mission operations interrelated interfaces involving Government and Industrial representatives from separate countries (with their different backgrounds, objectives, procedures and techniques, as well as the obvious differences in language, terminology and experience level) is directly related to the preagreement effort associated with understanding and satisfying these three guidelines.

• • •

NASA's Telex to the Government of the Federal Republic of Germany

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de gsts 054
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lrob/k kaesmeir/bmft/telex 85674
mbb/g scheil/telex 523748 mbbro d
erno/a kutzer/erno/west germany—telex 024 5548
lpfn/hgos/h porsche
jjpl/k heftman/jpl
gsrm/nasa hdqtrs code sl f kochendorfer code sa a opp

you are officially requested by the u.s. helios project manager not repeat not to send any ranging commands to helios a or b and not to change from medium power to high power on helios a or b under any circumstances.
these restrictions should be made clear to all command operators and should remain in effect until after a complete review and written agreement between nasa and the bmft/dfvlr.
i understand that these measures are consistent with your own judgement.

regards/ousley
sgd/gilbert w. ousley, helios pm

13/2330z dec 76 gsts

22516 nasa e
885674 bmft d

Technical Memorandum 33-752—Tracking and Data Systems Support for the HELIOS Project

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Technical Memorandum 33-752

Volume I

Tracking and Data Systems Support for the Helios Project

Project Development Through End of Mission

Phase II

JET PROPULSION LABORATORY

CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA

July 1, 1976

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1. *International Data Flow*

The HELIOS international data flow is depicted in Fig. 22. In this diagram, the U.S. responsibilities lie basically to the left, while the German responsibilities lie to the right with the interface region lying between the dashed lines.

Within the U.S. responsibilities, the DSN is responsible both for compatibility testing and for data acquisition dur-

ing the deep space phase. In addition, the DSN provides the use of a part of the joint DSN/STDN facility at Merritt Island, Florida, to process and format Helios telemetry obtained by the near-Earth phase stations. The MCCC processes all spacecraft data received by both the DSN and NEPN to generate the Master Data Record (MDR) computer tapes which are prepared in duplicate and forwarded to the respective country's data centers. The MCCC also provides the Helios Mission Support Area (MSA) for Mission Phase I.

The German data flow responsibilities follow a similar structure. During time periods when the German stations are tracking, their data flow is direct to the German Space Operations Center (GSOC), where MDR tapes are prepared for that time interval. These German MDR tapes are also made in duplicate and forwarded to the same Data Centers for conversion into the individual Experimenter Data Record (EDR) computer tapes. However, for both convenience and economy, all of the German Control Center functions were combined within one facility, as shown by the dotted box in the righthand portion of Fig. 22.

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3. *DSN/German Network Interfaces*

The primary responsibility for data acquisition during the Helios (primary) mission rests with the NASA TDS organization, but during mission Phase II, tracking facilities within West Germany are utilized in conjunction with the DSN. Utilization of these German facilities is provided in a mission-independent manner; i.e., cross support is negotiated and conducted on a network-to-network basis.

Therefore, the network interface is operationally independent of the DSN/Project data interface. The physical interface between the two networks is provided by administrative teletype messages and voice circuit coordination.

Project Plan for HELIOS-A and -B, Goddard Space Flight Center

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PROJECT PLAN FOR HELIOS-A AND -B

NASA

GODDARD SPACE FLIGHT CENTER

GREENBELT, MARYLAND

1086

FOR OFFICIAL USE ONLY

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3.5 *GROUND SYSTEMS*

The HELIOS Project will be supported by the Deep Space Network (DSN) and the German communications system, command station, and data center. The data interfaces between the DSN and the German ground facilities will interface at the Madrid NASCOM station. At all times during the mission, DSN control will be exercised from the Space Flight Operations Facility (SFOF), Pasadena. Mission control by the project will be exercised in the early phases from the SFOF and later from the German Control Center in Oberpfaffenhofen.

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3.5.1.1 *Deep Space Network*

Basically the DSN will provide 85-foot (26 meter) antenna coverage for critical periods during the HELIOS mission.

Project Plan for HELIOS-A and -B, Goddard Space Flight Center

The DSN will provide 3 station coverage, 24 hours per day, from launch to first solar occultation. DSN coverage after first occultation will be on a shared basis with other competing space projects. In addition DSN coverage of HELIOS by the 210-foot network will be provided on a when required/when available basis.

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NASA's Letter dated May 11, 1977 to Respondent's Counsel

NASA

National Aeronautics and
Space Administration
Washington, D.C.
20546

May 11, 1977

Reply to Attn of: GP (77-37041)

David Toren, Esq.
Toren, McGeady and Stanger P.C.
521 Fifth Avenue
New York, NY 10017

Subject: Hughes v. MBB, No. 74-366 Orl-Civ.R

Dear Mr. Toren:

In connection with the subject litigation you have requested information relating to the operational status of the HELIOS spacecraft.

To obtain such information I contacted Dr. James Kupperian, current HELIOS Project Manager, Goddard Space Flight Center, and Mr. Fred D. Kochendorfer, HELIOS Program Manager, NASA Headquarters. Both men confirmed that HELIOS-A and HELIOS-B are operational as of this date. That is, both spacecraft are currently transmitting signals enabling the German and U.S. ground stations to track the spacecraft and collect scientific data produced by the on-board experiments.

Attachments 1-3 are representative documents evidencing the operational status of the HELIOS spacecraft. Attachment 1 is a telegram from the Jet Propulsion Laboratory

NASA's Letter dated May 11, 1977 to Respondent's Counsel

(JPL) to NASA Headquarters giving a utilization report for the week of April 25 to May 1, 1977, of the 64-meter and 26-meter dish antennas used by the JPL Deep Space Network to track various spacecraft. The report indicates that HEL-1 (HELIOS-A) was tracked 84.4 hours during that week by the 26-meter dish and HEL-2 (HELIOS-B) was tracked 66.4 hours and 152.4 hours, respectively, during that week by the 64-meter dish and the 26-meter dish. The significance of this is, obviously, that spacecraft are not tracked unless they are operational.

Attachment 2 is a telegram from the German Control Center to NASA Headquarters indicating on April 13, 1977, (day of year (DOY) 103) "all subsystems and experiments worked normal" on HELIOS-1 (HELIOS-A).

Attachment 3 is a copy of the most recent Narrative Analysis of Project HELIOS.

In connection with your inquiry regarding any recent attitude maneuvers conducted by the HELIOS spacecraft I spoke with Mr. Kurt Heftman, HELIOS Support Manager at JPL. Mr. Heftman stated that his records indicated the last attitude maneuver on HELIOS-B was conducted on February 27, 1976. The spacecraft was commanded by the German Control Center to perform this maneuver.

Please advise if you should desire further information. It is a pleasure to be of assistance to you.

Very truly yours,

s/ Robert Kinberg
ROBERT KINBERG
Office of Assistant General
Counsel for Patent Matters

NASA's Letter dated May 11, 1977 to Respondent's Counsel

Attachments (3)

1. Telegram re DSN antenna utilization
2. Telegram re HELIOS-1 status
3. HELIOS Narrative Analysis

cc:

Keith Rockey w/attachments

The Preambles of the Asserted Claims of the Patents in Suit

THE ASSERTED CLAIMS OF THE PATENTS IN SUIT ARE DIRECTED TO THE COMBINATION OF SPACE VEHICLES AND CONTROL SYSTEMS AND ARE NOT LIMITED TO ATTITUDE CONTROL SYSTEMS ALONE

The preambles of asserted claims 20, 22, 24, 26-29, 31, 32, 34, 36, 37, 40, 42-44 and 46-48 of the McLean Reissue, read as follows:

Claim 20

A vehicle capable of traveling in free space and adapted to be spin stabilized about a spin axis, said vehicle including: means . . . .

Claim 22

In a vehicle capable of traveling in free space while rotating about a spin axis . . . .

Claim 24

In a vehicle capable of traveling in free space while rotating about a spin axis . . . .

Claim 26

In a vehicle capable of traveling in free space and adapted to be spin stabilized about a spin axis . . . .

Claim 27

An orientation control system comprising: a spin stabilized vehicle; means carried by said vehicle . . . .

The Preambles of the Asserted Claims of the Patents in Suit

Claim 28

In a vehicle capable of traveling in free space while rotating about a spin axis . . . .

Claim 29

In a vehicle capable of traveling in free space and adapted to be spin stabilized about a spin axis . . . .

Claim 31

In a vehicle capable of traveling in free space while rotating about a spin axis. . . .

Claim 32

In a vehicle capable of traveling in free space while rotating about a spin axis. . . .

Claim 34

In a vehicle capable of traveling in free space while rotating about a spin axis. . . .

Claim 36

In combination, a spin stabilized vehicle, means carried by said vehicle . . . .

Claim 37

In combination, a spin stabilized vehicle, means carried by said vehicle . . . .

Claim 40

A spin stabilized vehicle, said vehicle including: means carried by said vehicle . . . .

The Preambles of the Asserted Claims of the Patents in Suit

Claim 42

A vehicle capable of traveling in free space and adapted to be spin stabilized about a spin axis, said vehicle including: means . . . .

Claim 43

In combination, a spin stabilized body, means carried by said body . . . .

Claim 44

In combination, a spin stabilized body, means carried by said body . . . .

Claim 46

In combination, a spin stabilized body, means carried by said body . . . .

Claim 47

A spin stabilized body, means carried by said body . . . .

Claim 48

In combination, a spin stabilized body; means carried by said body . . . .

The three claims of the Williams Patent start as follows:

Claim 1

Apparatus comprising:

(a) a body adapted to spin about an axis,

(b) fluid supply means . . . .

The Preambles of the Asserted Claims of the Patents in Suit

Claim 2

Apparatus for applying force to a spinning body by control from a location external to said body comprising:

(a) a body adapted to spin about a spin axis passing through the center of gravity thereof,

(b) means for . . . .

Claim 3

Apparatus for applying torque to a body spinning about a spin axis by control from a location external to said body, said torque being applied about a predetermined axis normal to said spin axis to precess said spin axis to point in a desired direction comprising:

(a) a body adapted to spin about a spin axis passing through the center of gravity thereof,

(b) fluid supply means . . . .

It follows that the claims referred to are all directed to "vehicles" or "bodies", to wit, satellites. The satellites are provided with "means", subsequently recited in the claims, for controlling the attitude of the vehicles or bodies. The claims thus call for a combination of which the accused attitude control system is only one part.

Letter from NASA to the Government of the Federal Republic of Germany Giving "Authorization and Consent"

Mar 18 1977

I/IPP
Ministerialdirektor Dr. Wolfgang Finke
Bundesministerium fuer Forschung
und Technologie
5300 Bonn 12
Postfach 120 370
Federal Republic of Germany

Dear Dr. Finke:

This is in response to your letters of February 14 and March 3, with respect to the jurisdictional issue in the Hughes/MBB patent infringement litigation.

The United States Government hereby gives its authorization and consent, without prejudice to any rights of indemnification for all use and manufacture of any invention described in and covered by U.S. Patent Nos. 3,758,051 and Reissue 26,887 in the performance of the obligations of the Government of the Federal Republic of Germany under the Memorandum of Understanding (MOU) of June 10, 1969 and in the performance of the obligations of MBB under its contract with the Government of the Federal Republic of Germany for services to be performed in the United States relative to the Helios satellites. This authorization and consent shall apply retroactively to all Helios-connected activities that have taken place.

We note that the Government of the Federal Republic of Germany agrees to hold harmless and indemnify the United States Government for any damages (including settlement

Letter from NASA to the Government of the Federal Republic of Germany Giving "Authorization and Consent"

payments) that may result from a suit against the United States Government for infringement of the above cited patents and are attributable to the practice of the patented inventions in the Helios satellites under the Memorandum of Understanding of June 10, 1969. The United States Government agrees to consult with the Government of the Federal Republic of Germany prior to any settlement.

If the above statement is acceptable to BMFT we would appreciate your confirming this to us.

Sincerely,

Original signed by
STEPHEN E. DOYLE

Arnold W. Frutkin
Assistant Administrator
for International Affairs